The Taholah Village Relocation

Kelsey Moldenke

Senior Planner

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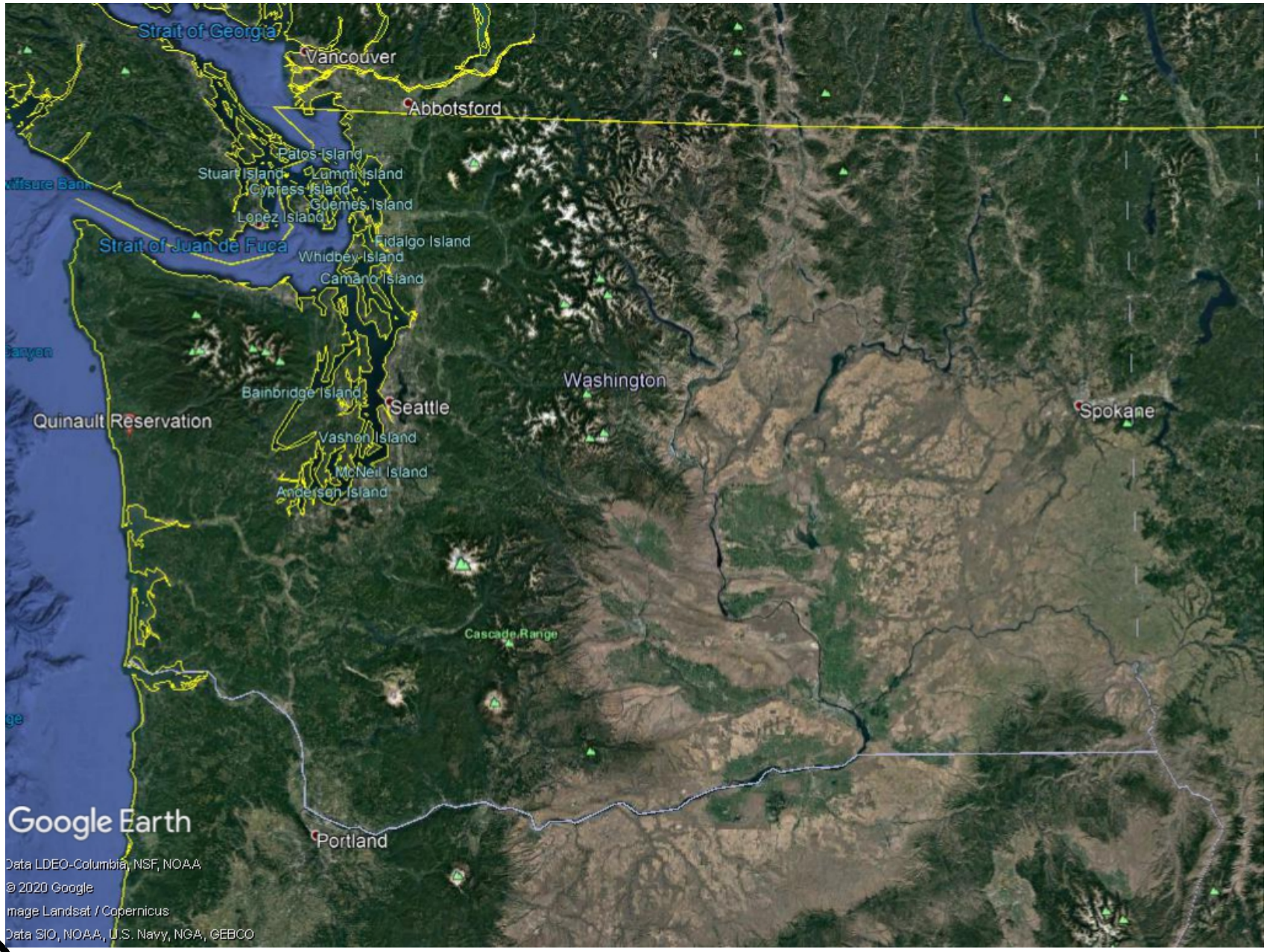
Overview

- Background on Entire Relocation Project
- Effects of Climate Change
- Overall Energy Strategy
- Microgrid
- Next Steps


Strait of Georgia
Vancouver
Abbotsford
Patos Island
Stuart Island
Lummi Island
Cypress Island
Guemes Island
Lopez Island
Strait of Juan de Fuca
Fidalgo Island
Whidbey Island
Camano Island
Washington
Bainbridge Island
Seattle
Spokane
Quinault Reservation
Vashon Island
McNeil Island
Anderson Island
Cascade Range
Portland
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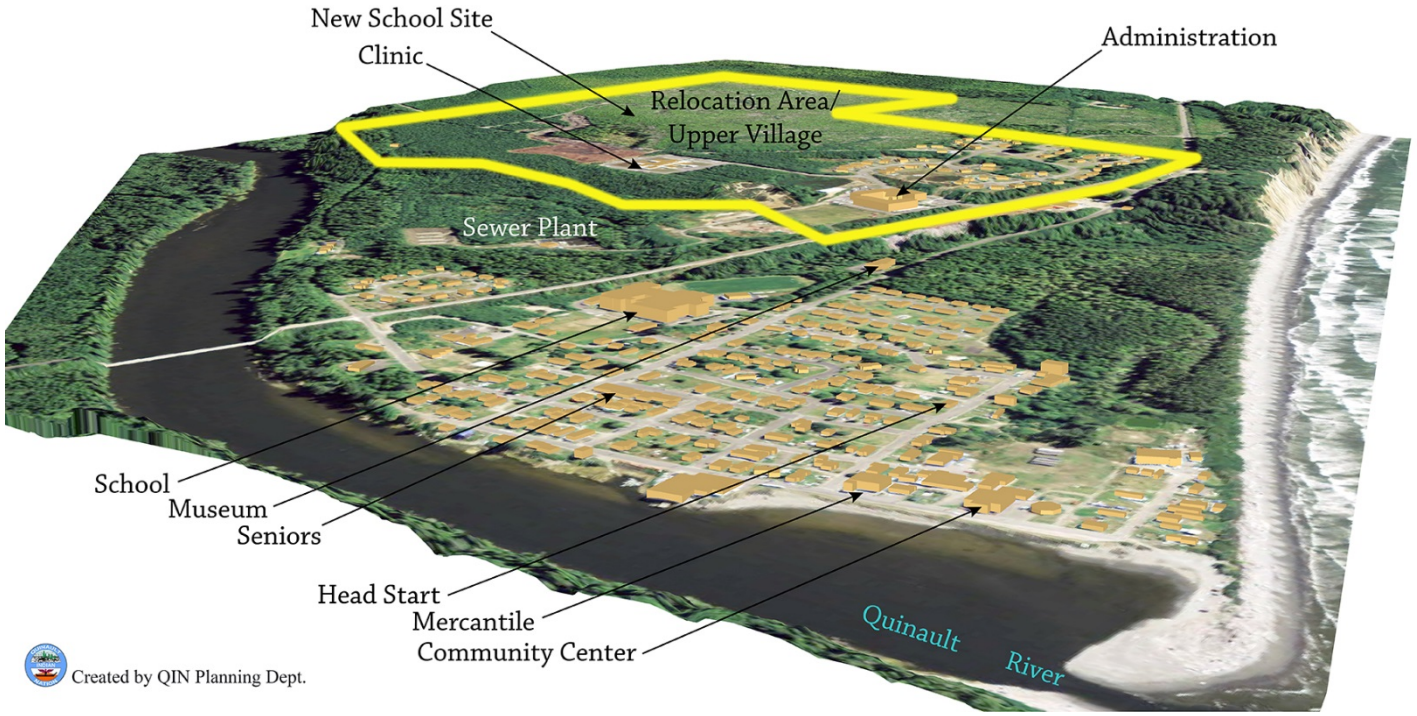
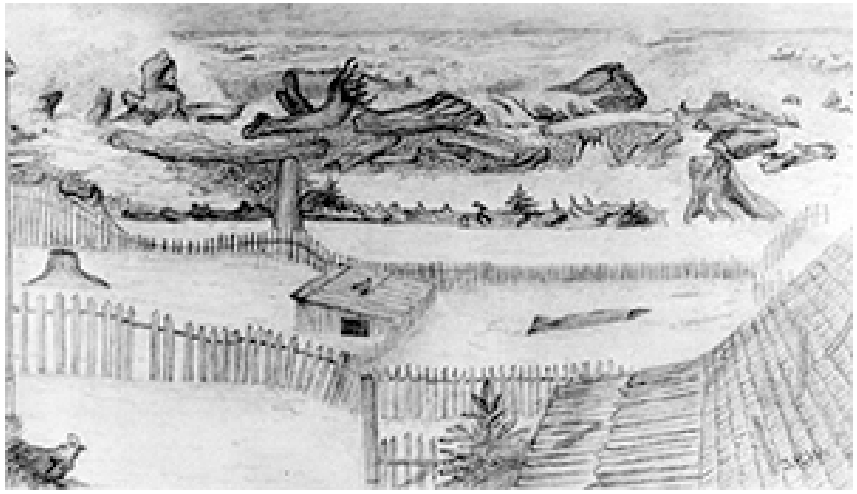
Taholah Village



Hazards

- Dual threats
  - Sea Level Rise
  - Tsunami from 9.0 earthquake
    - Cascadia Subduction Zone similar to tectonics that caused Indonesian tsunami in 2004
    - 5 to 20 minutes escape time (if good conditions)



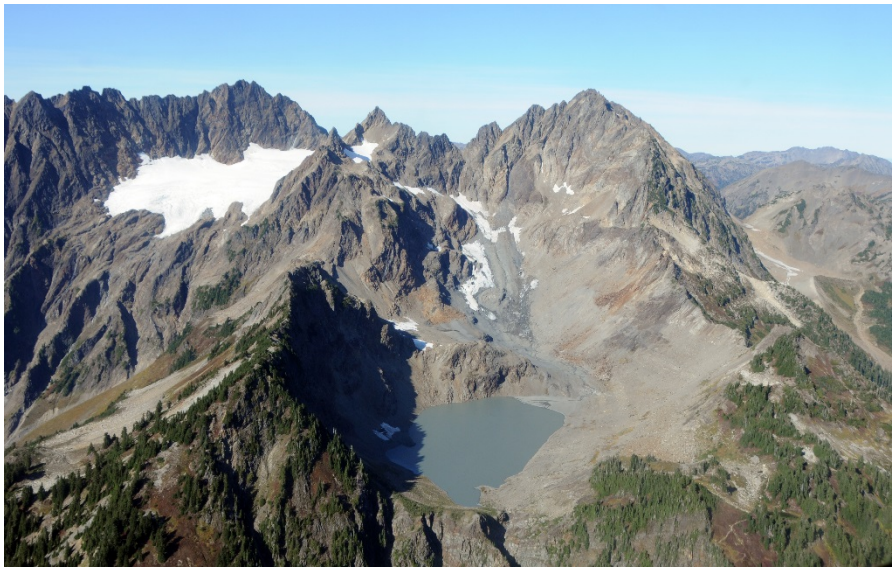
Late 1800's
Sketch of Coastal
Flooding in Taholah

Climate Change and Quinault

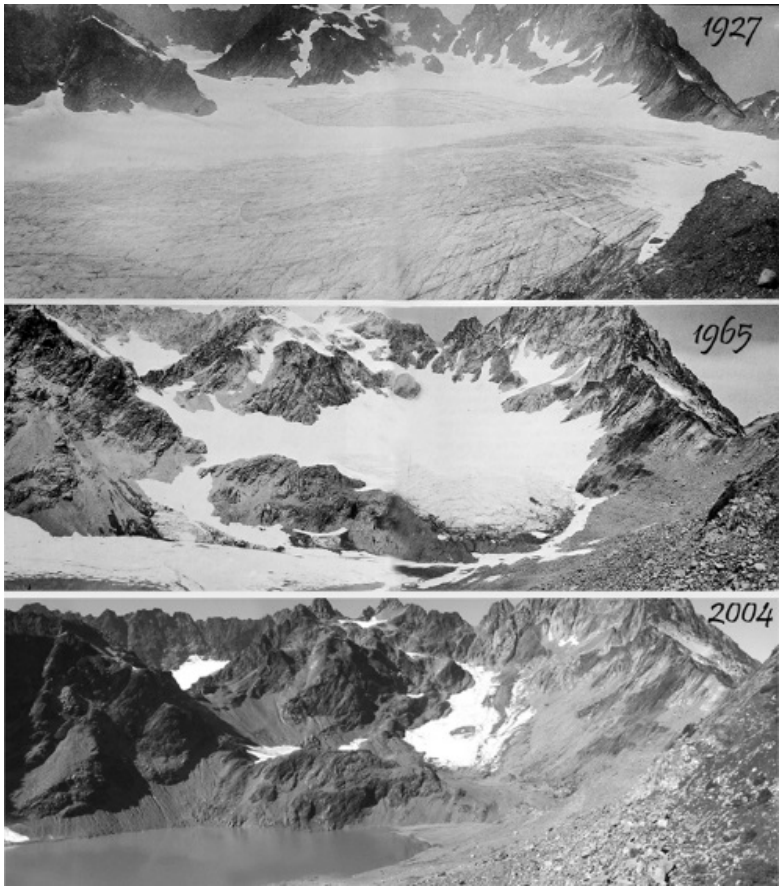
Resources at risk

- Clams – ocean acidification
- Salmon – warm waters, low river flow
- Trees – fire, pests
- The Quinault People

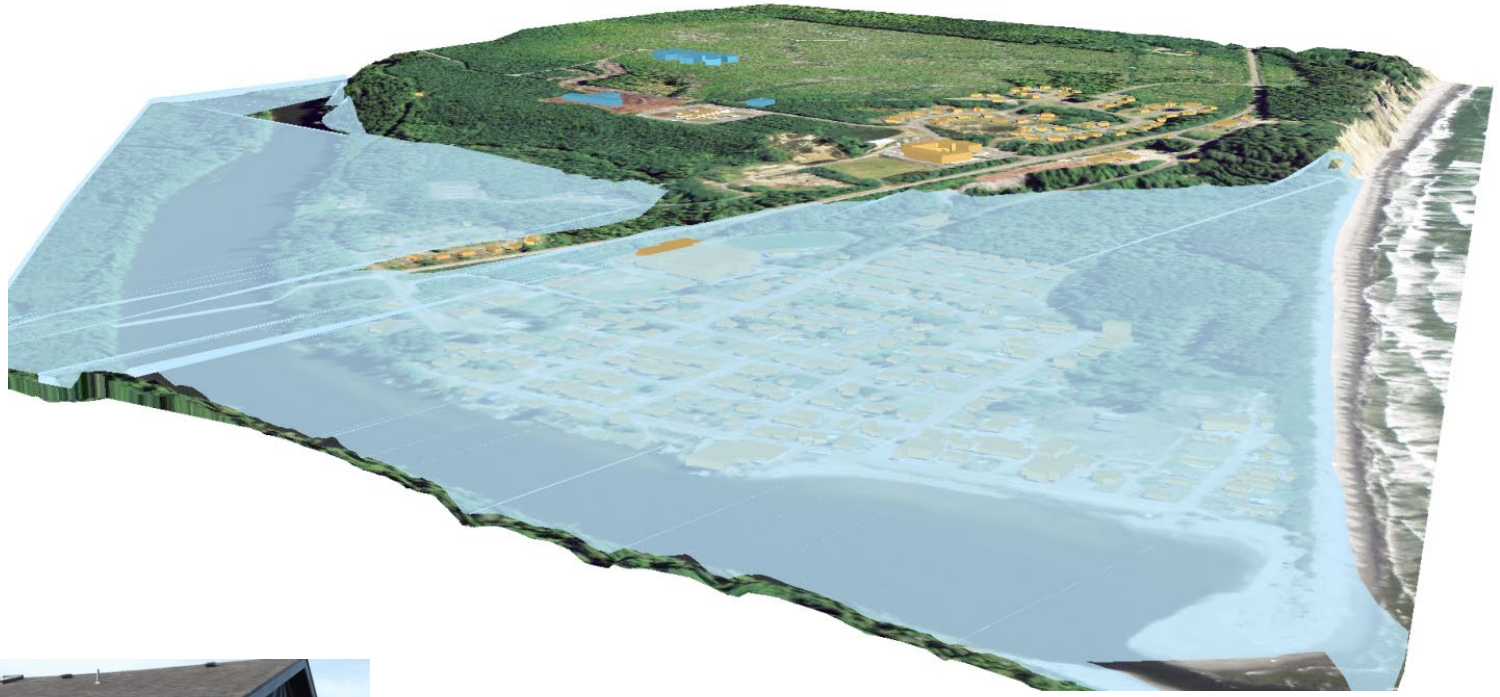
Climate Change and Quinault



Anderson Glacier, Headwaters of the Quinault River, Olympic National Park



Tsunami Inundation

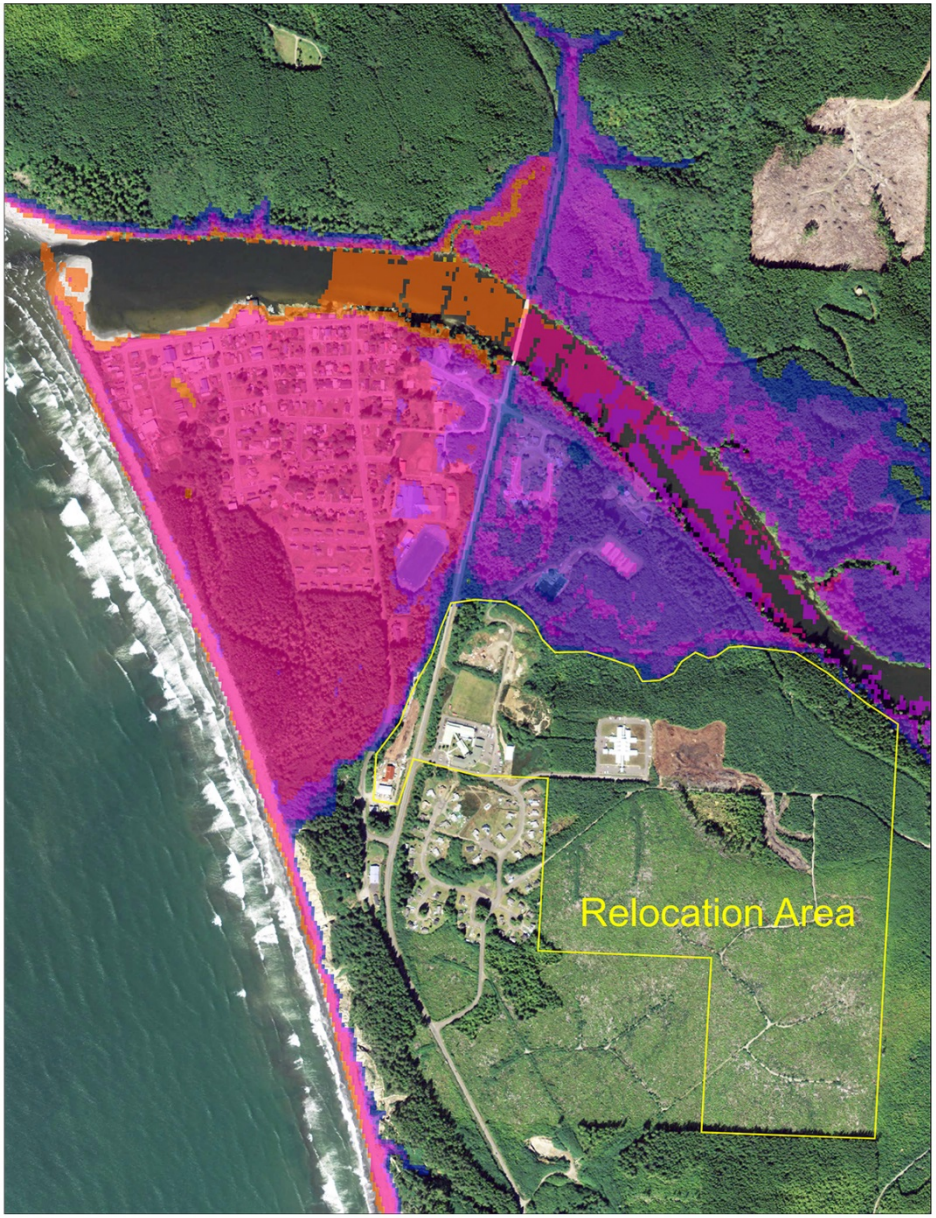


Senior Program

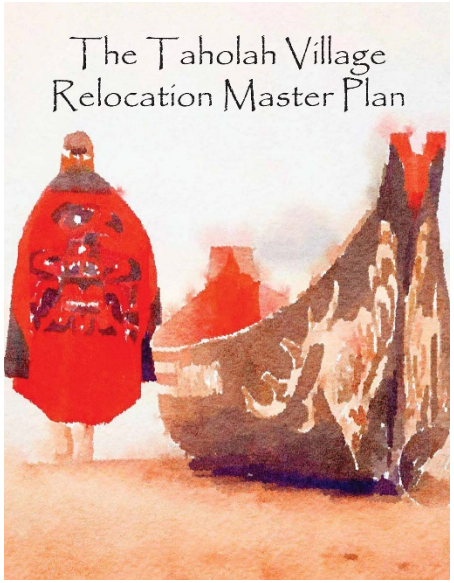
Head Start

Taholah School

Inundation Depth



Inundation Depths in Taholah from 2015 WaDNR Model



Landslide Threats

Community Input

April 23, 2014
Taholah Village Relocation Master Plan

Questions for the Community

1. When you think about the lower village of Taholah, what descriptive words come to mind?
2. What do you like about your community? What makes it special?
3. What is your vision for the new, upper village?
4. What characteristics would you bring from the lower village to the new upper village?
5. What type of housing would you like to have in the upper village?
   Single Family____ Apartments____ Duplex_____ Other_____
6. What don't you have in the lower village that you want in the new, upper village?
7. What is most important for your children in the new village? Select 3.
   - ❑ Playgrounds
   - ❑ Open/wild spaces
   - ❑ Trails to school/stores/neighbors
   - ❑ Safe streets
   - ❑ Other

Community Surveys:

Handed out at meetings, On-line, Web Site and Door-to-Door

Prior community prioritization
Newspaper articles

The Community

- We make the community special; the people, the Elders, the family.
- We all know and trust one another. We all come together in times of need.
- We are moving forward in helping our people, instead of just judging them.
- My community is also special because we look out for each other's kids and keep them safe.
- Parks and homes reflecting cultural awareness and pride; cedar, salmon, berries, in paintings, poles, canoes and signage.
- Everybody matters or nobody matters

Development Needs

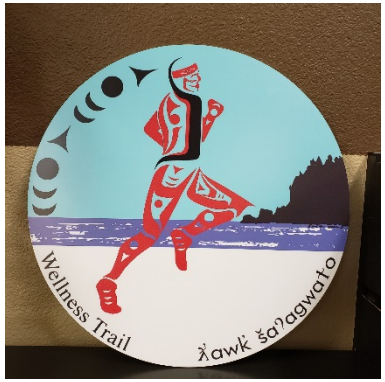
Housing

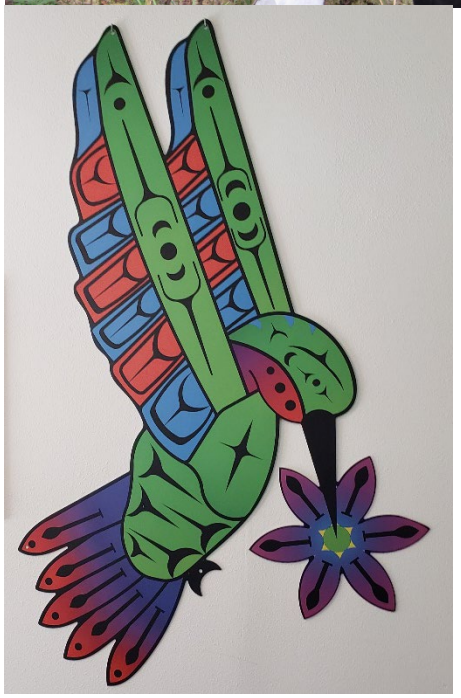
- 175 Homes and 650 people
- 129 Families on Housing Authority Waiting List

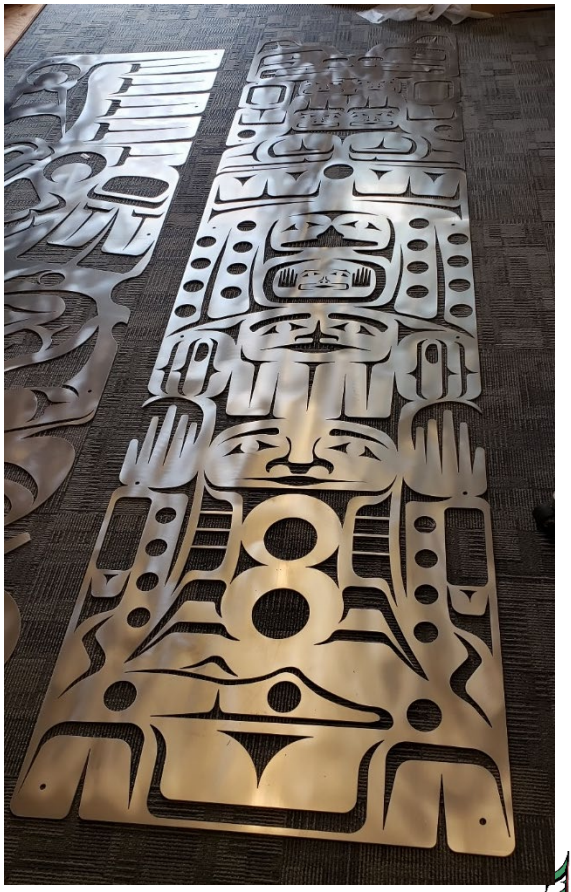
Community Buildings

- Administrative Offices, QNEB, QHA, Emergency Services, Courts, Post Office, Child & Health, Social Services = 175,000 SF
- 80,000 SF School

Culture



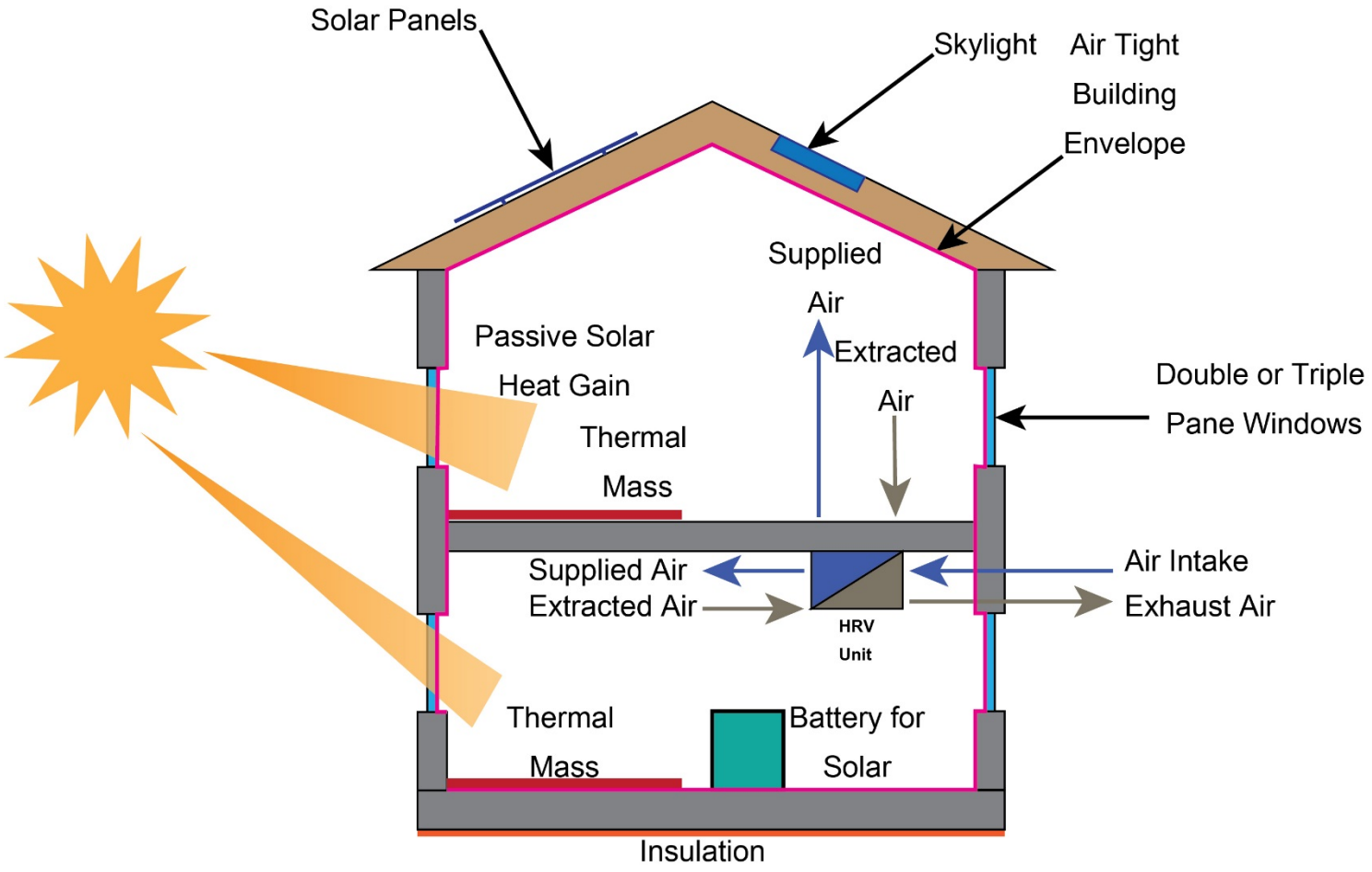




Concept

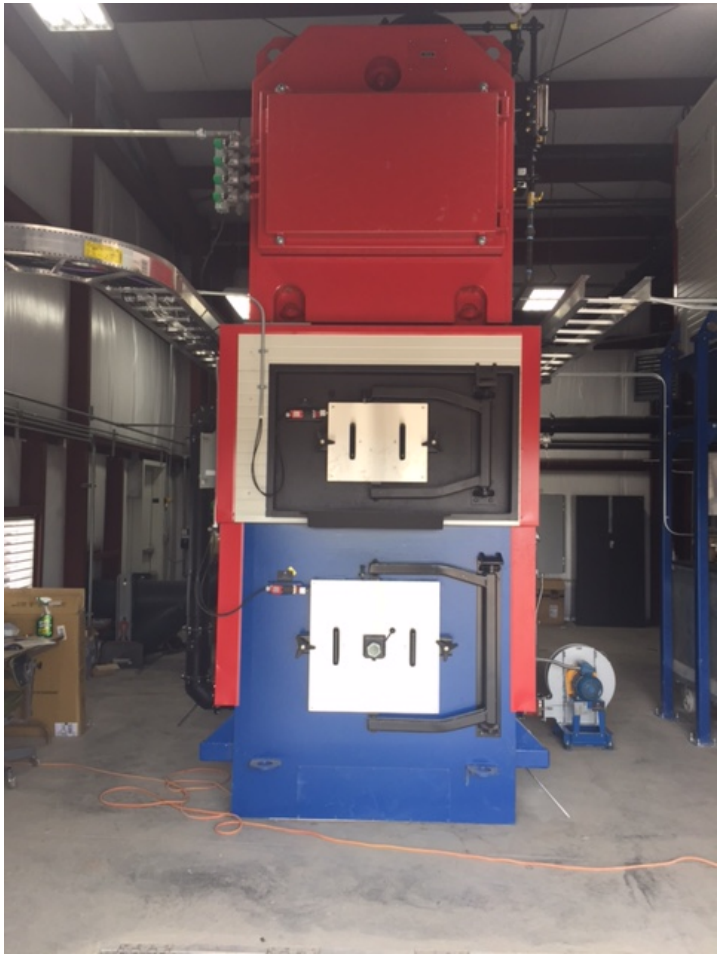

QUINAULT RIVER
SLAVE TO RIVER
EXISTING
UPPER
VILLAGE
School
Energy Park
Park
±5 acre
VILLAGE CONCEPT - MARCH 2017
TAHOLAH VILLAGE RELOCATION MASTER PLAN PROJECT

Quinault House



Energy Efficient and Climate Appropriate

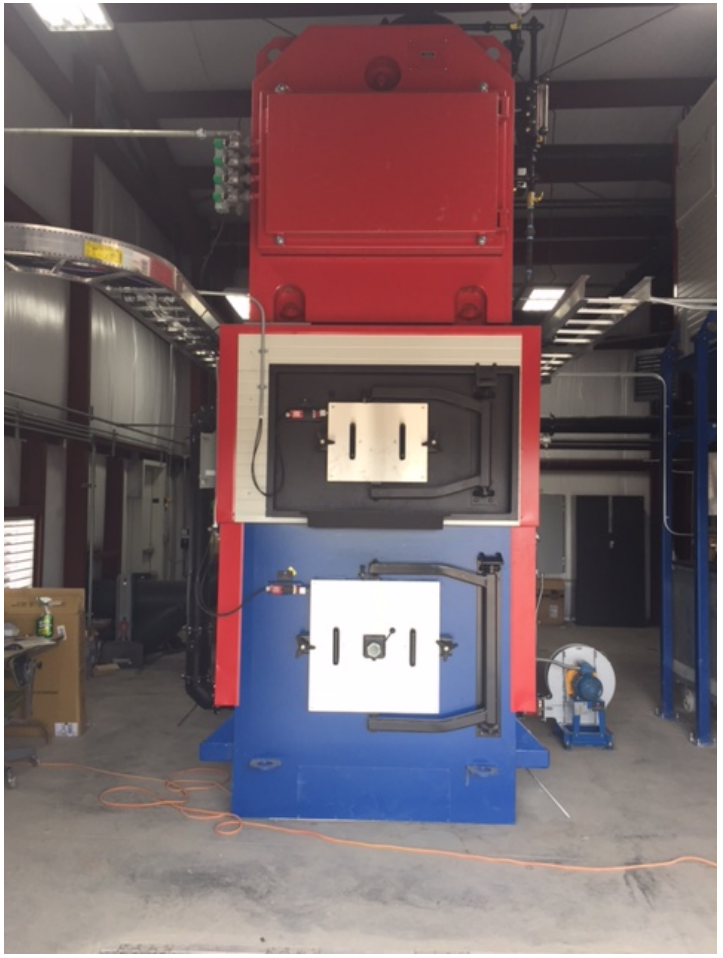
Energy Park



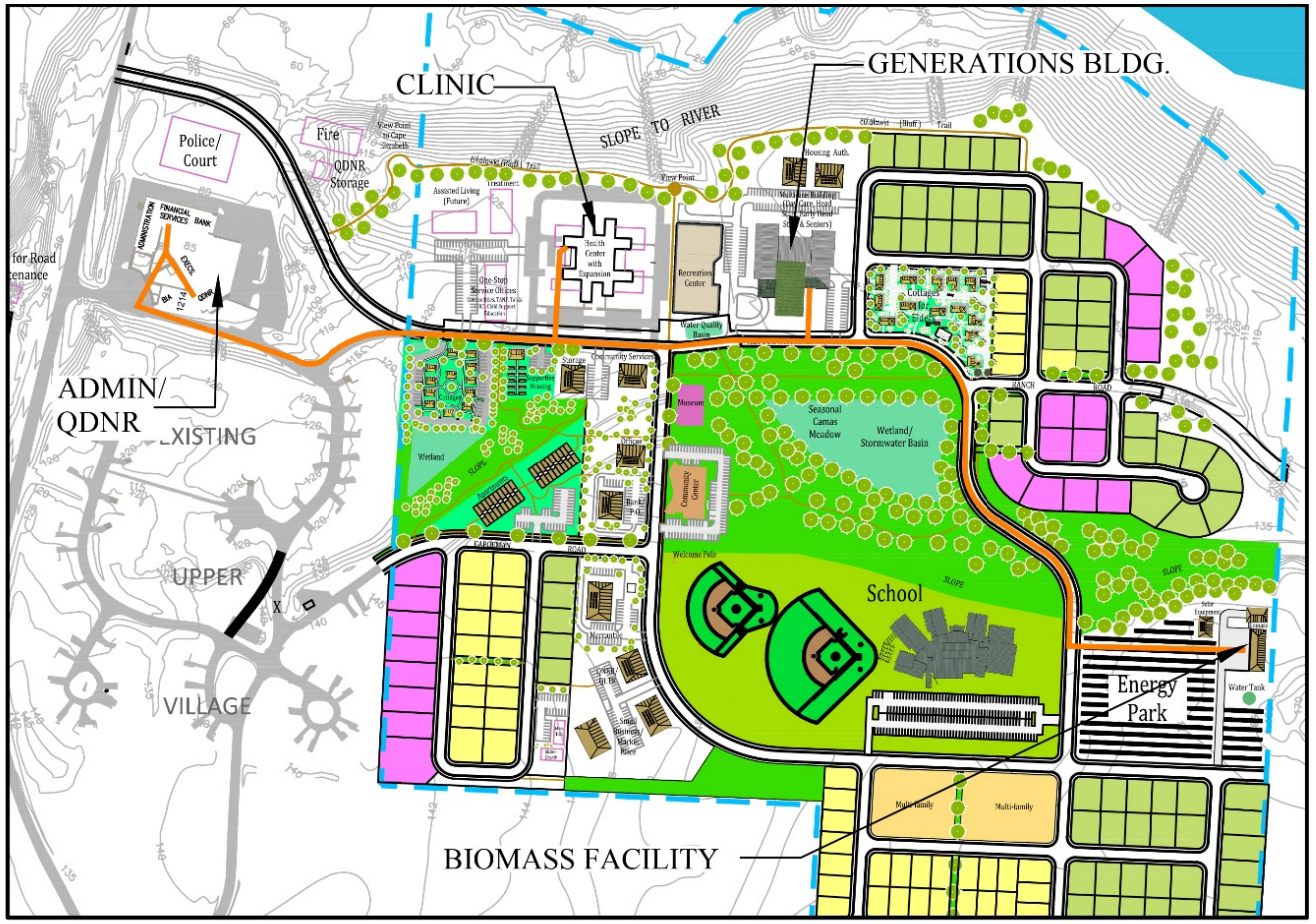
A way to safely shelter in place for months

Energy Strategy - Biomass

- Overall strategy based on Blue Lake Rancheria
- Slash abundant on Reservation
- Bring slash to Taholah, grind it to hogfuel
- Burn in boiler to heat water, water then powers heating in community buildings
- Based on system in Burns, OR that can take wet wood



Biomass Energy



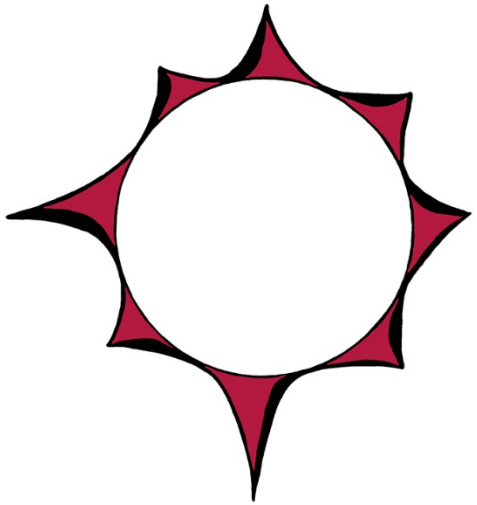
BIOMASS HOT WATER LINE CONCEPT

Biomass Hot Water Line

1 in = 400'

Energy Strategy - Solar

- Solar
  - 100 kW arrays w/ battery backup, combined with generator
  - 1 MW microgrid array for providing resilient power during a prolonged outage, which is anticipated to incorporate energy generation, storage, distribution
  - Current backup power is diesel
  - Net metering good, but survival imperative



Microgrid Study

Planning process for Microgrid:

- Phase 1: Microgrid concept development, partnerships and funding assessment
- Phase 2: Utility infrastructure upgrade cost estimate and microgrid load study analysis
- Phase 3: Microgrid system design engineering, contracting and implementation

Microgrid

- The microgrid system will be designed to prioritize energy storage for resilience, synchronizing a large battery system with planned solar PV arrays, and using microgrid controls to stabilize power generation and demand of critical Taholah Village Relocation Area facilities that will be interconnected to the microgrid distribution system.
- Energy cost savings and demand charge reductions during regular grid-tied operations are secondary benefits of a microgrid system

Microgrid

- The average estimated annual energy use for all village properties is assumed to be 6,108,001 kWh/year
- This level of energy consumption and associated power demand is not feasible for 100% back-up power from a single energy storage solution over a 2-year duration

Central Controller

- By specifying programmable inverters with this array, portions of the system can be curtailed, or flexibly taken off-line using a microgrid central controller (MGCC), to balance the microgrid system's real-time calibration of loads, generation and storage.
- Management of potential excess solar generation during islanding is a feasible operations scenario to meet the resiliency use case

Workforce Development

- The project kick-off workshop also highlighted the potential for training opportunities and workforce development with QIN Tribal members
- Opportunity to raise awareness about this project

Potential Funding

- Cost for 1 MW: $1.4-$2.5 million (in 10 years)
- USDA - Community Facilities Direct Loan & Grant Program
- USDA – REAP Grants
- DOE - Energy Infrastructure Deployment on Tribal Lands
- Tribal Solar Accelerator Fund
- State of Washington Clean Energy Fund
- Tax Equity Investment
- Design Build Operate Maintain (DBOM)

Potential Obstacles

- Lack of existing road infrastructure to sites
- Lack of electrical infrastructure to connect to
  - Rebuild infrastructure in existing housing development
  - Lack of infrastructure to connect to rest of grid
- The Clean Energy Fund ‘Grid Modernization’ grant is most likely source, so coordination with Grays Harbor PUD is required for developing grant

Partners

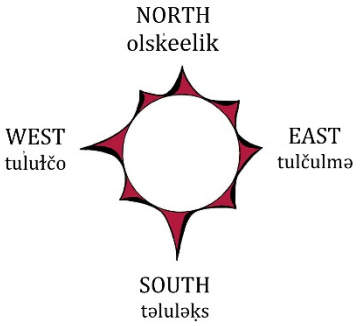
- Federal Agencies
  - Technical Assistance through USDOE Office Of Indian Energy
  - Grant from BIA
- Bonneville Environmental Foundation

Next Steps for Microgrid

Recommended Phase 2 activities include:

- Load study using 2-second interval metering data, including submetering of critical energy systems for the existing Administration and Health Clinic buildings, as well as the Generations Building by installing Advanced Metering Infrastructure (AMI)
- Grays Harbor PUD transformer upgrade analysis and cost estimates for total project costs
- Specifications development for microgrid system, including controls solutions for inverters, legacy generators, and critical facilities

Where Do We Go Next?



- Grant Writing/Fundraising
- Strategies to Help People to Relocate
- Engineering/Architecture Plans/Build!
  - One building down, so many to go!
- Moratorium in Lower Village
- Additional NEPA (Federal Environmental Review)
- New Staff (e.g. parks maintenance year-round)
- Continue Alternative Energy Projects, build 100 kW array
- Queets Relocation

Siokwil

kmoldenke@quinault.org